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ABSTRACT

Third World libraries, as a rule, receive information technology, technical assistance, and training as part of international development projects. Library improvements and their intended objective, information transfer, are more effective and lasting if key administrative and policy issues are addressed by the projects. Critical success factors for libraries and documentation centers in developing countries are: (1) the position of the library/documentation center within the parent institution; (2) the host country budget; (3) the director; (4) commitment to and resources for human resources development; (5) cooperation between libraries, documentation centers, and publishers in the country; and (6) linkages to regional and international networks. The five "pillars"--the necessary components of sustainable scientific information systems--are economic-technical infrastructure, information policy, information technology, human resource development, and management. (6 references) (Author/MAB)

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ADMINISTRATIVE ASPECTS OF THIRD WORLD LIBRARY DEVELOPMENT; THE FIVE "PILLARS" OF SUSTAINABLE INFORMATION TRANSFER

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Abstract

Third World libraries, as a rule, receive information technology, technical assistance, and training as part of international development projects. Library improvements and its intended objective, information tranfer, are more effective and lasting, if key administrative and policy issues are addressed by the projects.

Critical success factors for libraries and documentation centers in developing countries are: the position of the library/documentation center within the parent institution, host country budget, the director, commitment to and resources for human resources development, cooperation between libraries, documentation centers and publishers in the country, and linkages to regional and international networks.

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INTRODUCTION

In international development projects, sustainability is an important issue. Considerable resources are invested into irrigation systems, health care systems, agricultural production systems, to build or improve the economy of developing countries and the welfare of their population. Most of these efforts are not planned as "one-shot" or stop-gap solutions. Sustainability, that is continuity and further development by the recipient country of the system is the goal. It means that when a project, that is grants of money, technical assistance, and the shipment and installation of commodities is over, the country must have the ability to maintain and even further develop the system, and to utilize it appropriately-be it a dam or a canal, a factory, public health measures, or community services.

International development projects are evaluated over the long term by this continuity or sustainability. Scientific/technical information transfer is often part of development projects, and less frequently a project in its own right. The concern for sustainability applies also to scientific/technical information transfer.

CONCEPTS

Scientific/technical information transfer is defined as the flow of information about scientific discoveries and technologies to developing countries. It can occur by means of direct communication by experts, researchers, technicians, or as literature, that is documents (primary, secondary, and tertiary literature).

Information transfer facilitates technology transfer, that is the utilization of information, the adoption of new technologies and products. Information, in Schumacher's words, is the "intellectual infrastructure" of development .

To build a system of information transfer, that is, an organized flow of information to a population of information users(or potential users), is to create a permanent arrangement to tap the various information sources for the benefit of the recipients.

Sustainable information transfer systems have to be built by institutions of the recipient country.

Technical assistance projects often provide information in various forms: expert visits, consultation, training, correspondence. Database access may be established utilizing project funds, but it lasts only as long as the project does. Technical staff (engineers, data processing specialists) on the project often assume the task of organizing information. Information transfer in most of these cases is not sustainable.

Systematic information transfer for the long term can be established only through a library or information center. Permanent access to literature is best established according to standardized practices used by the library-information community: the identification of literature, utilization of secondary sources in paper or electronic formats (acquisition of secondary sources, or remote use of secondary sources), acquisition of documents through purchase, systematically or on demand, document delivery (loans or copies), and the organization of documents, with their ultimate dissemination for use. Organization of the documents acquired in anticipation of recurring use is a typical library-and-information function.

The library or information center can serve a narrowly defined population, by specialty or geographically, or a whole sector, such as the health sector, or the agricultural sector. The information system, which serves a sector of a whole country can be called a national information system.

In a developing country planners of a technical information system have to pay attention to either utilize, to improve, or to establish five "pillars" of an information system -paraphrasing T.E. Lawrence's "seven pillars of wisdom" - as a matter of strategy in establishing a effective and sustainable information system. The foundations of a sustainable system of technical information system are, as if they were "pillars" of a bridge or highway. Ideally the sustainable system also has the ability to adopt to changes in the environment, such as technological change, and also the ability to increase its capacity.

The five pillars, the necessary components of sustainable scientific information systems are: economic-technical infrastructure, information policy, information technology, human resource development, and management.

Management, infrastructure, manpower, and an information policy, are essential in addition to information technology. The economic-technical infrastructure of the country and of the institution should be able to support information transfer, and support also the information technology

provided. There must be an information policy, that assigns permanent responsibility and budget for information transfer to an organization, ideally to an information/library center or system. The country and the institution has to develop and retain human resources to implement information transfer. Good management may compensate for weakness in the foundations to a certain extent.

A developing country would not be a developing country, if all the pillars were in place. International development projects provide unique opportunities to build the foundations of sustainable scientific-technical information transfer systems.

A typical international development project is a technical assistance program, which uses funds given to a country as grants by a donor agency, such as the World Bank, an international agency, or a developed country. Specific goals are accomplished through project activities over several years, such as construction, renovation of facilities, the purchase of commodities, and manpower training.

The project is usually a joint effort of institutions or organizations in the recipient country and by the technical assistance teams or consulting experts on contract with the donor agencies. By the end of the project the recipient country should operate the facilities established without further technical assistance from foreign experts.

Scientific-technical information transfer is most frequently part of larger projects. Examples of such projects are : improving the capacity of the government for planning energy policy, improving the country's irrigation system, improving research and technology transfer in agriculture. Information transfer is planned mostly as a subordinated activity, without significant involvement of information professionals. According to the World Bank, over two hundred projects had information transfer components over the past twenty years (there may be a variance between our definitions). Only in isolated few instances is there an independent project of information transfer, thanks to country priorities, and donor appreciation of its mission.

Project planners often consider information technology (commodities, such as books, computer catalogs, databases, publishing systems) sufficient for information transfer. The new electronic information technologies can be so tempting to donor and recipient, that they may overlook other important components of the total information system.

While this technology is necessary, it is not sufficient for a sustainable system. Examples of "stand-alone technology" abound in developing countries: scattered cartons

of unopened books and journals with no place for them, microfiche readers with 110 volt currents(in 220 volt countries) without lenses, and computers without training manuals. At the other end of the spectrum is a library building, completely equipped, but without an operating budget for personnel, maintenance, and supplies.

The outline of the five critical components presented below introduces the concepts discussed later. The results of the research do not represent criticism of the information systems, nor of the specific countries - they only evaluate the accomplishments of the specific projects.

I. ECONOMIC-TECHNICAL INFRASTRUCTURE
   1. Macroeconomic (country level):
      1.1 Local and foreign currency for information products and services
      1.2 Information industry (manufacturing, trade, equipment maintenance and repair service industry)
      1.3 Transportation and communication systems
   2. Microeconomic (institution level)
      2.1 Regular budget for information products in local and foreign currency -- collection development
      2.2 Operations budget for recurrent expenditures
      -- information organization/processing and
      -- information services

II. INFORMATION POLICY, INCLUDING POLITICAL-ECONOMIC ORGANIZATION
   1. Recipient agency designation
   2. Cooperation and coordination
   3. Statutes and implementation rules (legislation and execution)
   4. Committees

III. INFORMATION TECHNOLOGY
   1. Appropriate technology
   2. Standards
   3. Hardware/software; system upgrading, maintenance, replacement
   4. Automation coordination and networking
   5. Adaptation and derivative products

IV. HUMAN RESOURCES DEVELOPMENT
   1. Career development
   2. Education and training facilities
   3. Staff skills
   4. User training

V. MANAGEMENT
   1. Top executive with authority and status

2. Management skills and technical skills
3. Leadership in fundraising and cooperation
5. Pre-and post- project planning
6. Resource sharing and cooperation

METHOD and RESULTS

Fifteen development projects in the Middle East were examined for the five critical components. Qualitative interviews and investigative reporting, combined with participant observation and documentary research (project plans, reports, and evaluations) were the research methods. Each of the presenters were participant observers of at least one of the information transfer efforts.

Illustrative case studies are presented. Scoring the fifteen projects on establishing IT and on sustainability on a 4-point scale, revealed that information centers, libraries, and other resources created by projects, when isolated physically and organizationally from existing libraries and centers, did not survive. Basic and intermediate technology(conventional library materials and well supported microform hardware and software), combined with good management and human resources development, in a stable organizational environment, was most successful. High information technology introduced problems of funding for maintenance and upgrade, with keeping trained manpower.

Overall, the policy "pillar" was the weakest: responsibility was not assigned to the appropriate organization for information transfer. Economic-technical infrastructure was weak also; it is outside the domain of proects. Management is noted as weak, if the project plan did not treat the information transfer effort, or library in sufficient detail, relative to other project components, and consequently it did not receive appropriate resources.

CASE STUDIES

CASE A. A small project devoted to information transfer in a small country with limited resources.

This is a case of short-term technical assistance of 16 months duration, completed in 1984. Its goal was to establish an information transfer mechanism in an environment of restricted information flow within an organization, to make information available to the whole sector. Observations on its sustainability were made in 1989.

Background.

As a result of the return of trained researchers from

abroad, the government has recently reorganized its research and development to ensure a visible flow of administrative information upward and downward. Scientific-technical information transfer was a peripheral consideration, with limited access to information to most categories of users as a result. Training opportunities and the number of trained personnel and managers increased; yet the sector depended on outside expertise for information services. The country's poor technological infrastructure was a constraint to modernizing technology.

Library resources of the country and of the capital were in the infancy of their development. Centralized library services, typically supplied by a national library, such as a national bibliography, union catalog, central resources for interlibrary loans, and in-service training opportunities were lacking. A legal deposit system became operational in 1988.

The goal of the technical assistance project was to establish the national documentation center, to carry out the following tasks:
- Establish bibliographic control of the national literature;
- Provide documents and data to individuals and organizations
- Participate actively in international cooperative information systems, and cooperate with appropriate foreign national or regional information systems promoting information exchange;
- Train local staff and users;
- Provide basic equipment.

I. Economic-technical infrastructure.

The country suffers from a severe lack of hard currency resources. The amount allocated to investment in cultural and mass media services during the last 5-year plan is 1.4% of the total investment. The library-information transfer system, a portion of a broad spectrum of other cultural and mass media services, receives a very meager portion of this amount. In the meantime, information facilities within various types of institutions are neglected, regarding their budget, staff, and equipment.

Commercial publishing is not thriving in the country. Publishing concentrates on cultural and political literature. Local scientific, technical, and development information is released in government reports, project documents, and theses, which are not readily available to the public through ordinary channels. As a result of the return of scientists from abroad, it is apparent, that opportunities improved to publish indigenous scientific journals. Standing publishing committees in government departments started formulating their policies. The book trade is inadequate. The

only authorized agent to contact foreign distributors is a public press agency with little technical experience in book purchasing; acquisitions and subscription procedures are complicated by red tape.

Library acquisitions activity is mainly passive and is occasional. Regular budgets are too small to cover recurrent expenditures after project termination; the result is incomplete runs of journals, an outdated collection of books, and insufficient services.

Collection development.

The local in-house collection is successfully established. It includes national materials produced locally and abroad, in paper and microfiche form, current, and older. A systematic flow of UN publications and other gifts has been established.

Information processing.

The processing of indigenous literature and local technical documents is carried out satisfactorily. A functional connection to the international cooperative information system has been a decisive factor in assuring progress in conforming to international standards.

Information services.

There is an SDI(selective dissemination of information) system: it provides users with lists of references every two months, based on their profiles, and with retrospective bibliographic searches through an international cooperative information system. The center is a member of this cooperative system, and contributes to it (inputs data).

II. Information policy.

Recipient agency designation.

The designation of the recipient agency has been the subject of extensive negotiations. There has been conflict between the research community and the development and planning agency, and competition for the information center. A decision was made to attach the information center to the planning and development agency on the basis of its location, most convenient to a diversity of potential information users.

During the term of the project the information center was attached to the office of the Deputy Minister supervising research and planning, where it received excellent administrative support, which, in turn contributed to good performance, adequate supervision, and resulted in services to a diversity of users. The situation changed after two years, when the information center was transferred to the ministry's research department. This as a setback.

Cooperation and coordination.

The government and authorities realized the need for a strong functional coordination mechanism, in conjunction with plans for a national information network. This network is to be established in a follow-on technical assistance project, which has been a subject of lengthy negotiations between the government and the donor. The donor insists on cooperation, to improve the chances of sustainability.

The network will coordinate the work of the libraries and information facilities of the sector in the country, to collect, process, and disseminate information for the whole sector. The network will assist in strengthening existing capabilities, and in creating new facilities, identified by the institutions of the sector.

The creation of the network will not have any effect on the administrative structure of the center -- it will merely monitor and supervise the technical operations of the respective library and information facilities.

Committees.

There are individual initiatives for joint library and information work, stimulated by technical consultants. A standing committee of directors of information and library facilities of the major sectors was formed, to start cooperation according to common standards. The library/ information advisory committee is not officially formed. In some organizations occasional meetings are called on library and information issues.

Although a few dedicated librarians and enlightened users are well aware of the needs and of the importance of information transfer, they are unable to take any action due to lack of funds and authority.

III. Information technology.

Traditional library materials

New books are purchased when funds become available, episodically, and not on the basis of continuous needs assessment. Obsolete and outdated materials are not removed, thus the collection is generally outdated.

At a major library current journal subscriptions, financed by a project, account for only 15% (33 out of 263) of the titles in the libraries, leaving 85% of the journals incomplete, with subscriptions ceased. The Government has not paid for journal subscriptions before the project --recurrent budgeting is presently considered, but foreign currency resources are limited.

The Government is planning to publish a high-quality specialty journal, and to utilize it for revitalizing the gift and exchange program.

Equipment

In satisfying equipment requirements, the project has strived hard to match existing local maintenance capabilities of the public sector. In some other information transfer projects costly equipment was received without adequate installation and maintenance provisions. The country's centralized foreign purchasing system lacks the expertise to select equipment, which is appropriate for local weather conditions, work styles, and technical abilities of the workers. Subcontracting with other agencies for work on special equipment, e.g., micrography, as an alternative to owning equipment, was found unreliable.

Computer hardware /software

The increasing use of computers, the proliferation of hardware and software, created problems with equipment compatibility on the national level. In the country the use of computer technology is in its infancy, and its development does not promise to be systematic or consistent.Agencies with computers indulge in replacements and buying new hardware for new applications. In this environment information systems managers have not been able to identify needs properly : guidance and standardization of microcomputer systems (hardware and software) are needed.

The central statistical agency is the major computer user of the country. Recently its IBM (mainframe) was replaced by an ICL system, for which regular maintenance service is guaranteed.

The information/library community has not been engaged in computerization yet. Nevertheless, it is looking forward to converting to computer processing, after sound plans will be made.

IV. Human resources development.

Staff training

By the end of the project the local staff of the documentation center was well acquainted with library and information center operations and services, after training on the job and abroad. Members of the staff have manifested interest and ability in library-information work. Two members of the staff expressed desire to continue their studies in the field.

The country has no educational or training facilities in

library-information work, but basic training can be provided in-house. Members of the traditional library profession in the country have low status and pay, and very few received formal training. A considerable number have received informal training abroad through technical assistance.

Staff motivation is not exclusively bound to status, salary, and material conditions. Individuals and the group were committed to fulfill the obectives of the project. In this spirit, they were well motivated to start user services.

The expansion of librarianship to documentation, information work, and informatics, and its technical complexity, in particular, computer work, has motivated some promising members of the staff to enter this career. The female element demonstrated more ability, interest, perseverance, stability, and industry.

User training

Under the present conditions the effectiveness of information services of all kinds is severely limited by the lack of awareness of the vast majority of users, and their lack of training. Projects don't usually include a user training component. User training was given on the occasion of the consultant's short visits. Researchers were introduced to the information cycle and to services they were trained in identifying documents, query formulation, bibliographic searching, current information sources, and briefed on their role in the development of the information transfer system.

V. Management, including planning.

Due to the low social and material status of information transfer system managers in the country, promising people do not show commitment to a permanent career in the information sector.An information transfer manager seldom combines technical skills with policy-level experience. Managers do not emphasize maturity and integrity in dealing with the public, which is a crucial factor in an information career. Seniority is always the major factor in appointing managers.

Top managers seldom delegate appropriate authority to middle management. They hold on to the authority, and strive to control everything, handicapping middle managers. Due to lack of delegation, smooth procedure flows and staff assignments are difficult to implement.

During pre-project planning, more time should have been allocated to defining the mission of the Center, and to assessing the feasibility of implementing some project components. As a result,

- the implementation plan did not consider the needs and

resources;
- plans underestimated the difficulty of obtaining access to data to be collected.

During implementation management had the tendency to hide and deny problems, as they arose. This, in turn, prevented the timely resolution of these problems.

Concluding comments.

The center's status and plans made beyond the project are good indication of the sustainability of the information transfer effort.

Before concluding the project of 16 months, a work plan was prepared for post-project developments, to upgrade its potential for information transfer. This plan called for the establishment of a national information network serving the sector, by strengthening existing libraries and creating new ones in strategic locations and specific subjects. Management did not understand these plans adequately, thus it could not negotiate successfully with potential donors.

Plans for resource sharing do not appear to have much promise. The terms for cooperation between various institutions have not been defined, yet cooperation may be the best solution for information transfer.

Case B. The central information center for the country's agricultural sector.

I. Information policy.

The country is implementing a considerable number of agricultural research and development projects, agriculture being the major industry, and most critical priority. It has been recognized officially that political and technical decisions and their implementation for developing agriculture and allied fields have to be based on the comprehensive awareness of agricultural literature.

The Ministry established an agricultural documentation and information center(the Center) to achieve better control of its national literature of agriculture, published or unpublished. The Center builds mechanisms to capture all this literature, and to input it into the AGRIS and CARIS databases; then it produces from AGRIS the national agricultural bibliography, for the benefit of the government's agricultural institutions and agricultural scientists.

Since its inception in 1975, the Center has produced the annual national agricultural bibliography from 1978 to 1989, and other bibliographies and directories. The national

agricultural database that the Center built numbered 20,000 records in 1989. Presently the Center is developing and maintaining files on ongoing agricultural research projects, theses, institutions, and research workers.

The Center is designated to be the information retrieval center, providing retrospective search and SDI services, and since 1979 document delivery services. In 1989 the Center provided 912 subject searches for 964 users, of which 50 were from foreign countries. To perform its functions adequately, the Center should work in coordination with a well-stocked library.

The Center is the country's liaison with FAO's documentation section. It also trains information workers in agricultural documentation, in coordination with the Ministry's international training center.The Center belongs to a large administrative unit within the Ministry coordinating between foreign countries and international organizations.

II. Information technology.

The Center has an AT&T 3B5 minicomputer, with 2 Mb memory, a 10 MHz clock, 500 Mb storage, 16 ports, Unix V/2.0 as well as a complete microfiche production unit. Eight terminal consoles, two star line printers, and two laser printers are linked to the computer.

The Center is adequately air conditioned and furnished. The equipment is maintained regularly, and the needed supplies for different operations are available, as funds are allocated for this purpose.

Presently management has to choose between using and maintaining this computer system or replacing it with state-of-the-art machinery. The computer requires more mass storage --its hard disk has been saturated.

Software development in the C language and in Shell language, and system development are achieved by in-house staff.

The Center is linked with the National Network of Science and Technology, as well as with international information systems, such as DIALOG and BRS, through telecommunications via a dial-up switching telephone line.

The Center is planning to acquire CD-ROM formats of AGRIS, CAB, and AGRICOLA databases.

Funds for upgrading the system are difficult to find, even though it is recognized that replacement would be more cost-effective than maintenance.

III. Economic-technical infrastructure.

The Center is fulfilling a much needed function, and is doing it well. Nevertheless, a strong national agricultural library is needed to enable the Center to expands its services, including document delivery.

The hard currency needed annually for telecommunications is not adequate; government funding generally is below the requirements in local currency for computer supplies, equipment replacement and upgrading. Other funds have to be made available, possibly including development project funds.

The Center earns 25% of its budget through a cost-recovery formula, which is basically charging fees for database search services and document delivery, according to subsidized pricing policy.

IV. Human resources development.

The Center's staff has excellent academic credentials, combining degrees in library and information science with basic science training. Some of the Center's staff were sent to full-scale formal degree programs in developed countries. Others are sent for short-term training and visit tours to good libraries and information centers in the West. The rest are trained locally.

The staff is doing a good job, but they could perform better, if they could attain higher salaries. Upward revision of the salary scale for the personnel of the technical consulting group has not been approved. This situation causes professional "brain drain", as salaries are higher in the country's private sector, and in the Arab countries salaries are relatively very high. The high attrition rate of experienced staff results in higher cost of services, since the junior staff, remaining to do the work, requires training and is less productive. The only solution that was found is to train new personnel.

V. Management and planning.

The Center is managed and plans its activities according to the following principles:

1. Build the system upon what has been designed and tested;
2. Cooperation and coordination are the keywords of the day;
3. Concentrate on completing tasks instead competing with other information systems within the Ministry;
4. Adopt standards of the International Standards organization (ISO);
5. Adopt mechanisms and guidelines of the AGRIS and

CARIS systems created by FAO in building the national databases.

A critical condition for good management and planning is to have sufficient funds to implement the program and tasks in due time. Although sufficient funds are not available, the Center is performing well, due to good management and motivated staff, that compensate partially for the shortage of funds.

The Center implements partially most of the tasks and activities, according to the annual plan, in the light of the information policy of the Ministry. It falls short of some of its program goals, due to shortages of funds.

Case C. A national scientific and technical information network, designed and established as part of a large project devoted to strengthening R&D in science and technology.

Funding to maintain and replace sizable computer facilities, and cooperation between members of the network endanger sustainability.

I. Information policy.

The National Scientific and Technical Information Network, the Network, is an open-ended geographically distributed network of autonomous organizations, that provide coordinated information services to decision makers and problem solvers. The form of the Network is a consortium, coordinated by a central office. The legal basis for the consortium is a set of bilateral agreements between the parent organization of the central coordinating office and network member organizations. The agreements, which spell out the mutual obligations and rights of the two parties, are subject to periodic renewal. The parent organization is the country's academy of science.

The logical structure of the network is comprised of three types, or sub-networks of information service organizations : sectoral (or specialized) nodes; regional (or general) nodes, and document delivery (or library) nodes. Their functions are distinguished as follows:

1. Members of the sectoral sub-network are the one and only nodes serving each major sector of the national economy. The development of this sub-network began in 1983. At present seven primary nodes have responsibility for nation-wide information services.

2. The purpose of the regional sub-network is to establish information services to those locations in the country, which have a high density of problem-solvers. The regional sub-network, started in 1988, depends on sectoral nodes and robust telecommunications. Currently there are three nodes; one more is to be established. They are typically located in regional universities.

3. The document delivery sub-network consists of major national libraries, with strong holdings in science and technology. Their function is to supply network users with photocopies of documents.

II. Information technology.

Each node has an AT&T minicomputer, with telecommunications access to each other, and to foreign databases via the country's telecommunication switch to remote gateways.

Replacement of the minicomputers at some of the nodes is desirable. At the active nodes, maintenance and repair over the long term is less cost-effective than replacement with state-of-the-art hardware.

Online searching of foreign databases is financed by the project, but due to lack of hard currency it is not sustainable. Fortunately, CD-ROM formats of some of the databases are increasingly utilized at some of the nodes.

The Network, established within the framework of the project, functions with extreme reliance on automation. In lieu of sophisticated technologies, simple mechanisms, such as manually compiled lists of journals and other document inventories, are not used as a substitute for document delivery from abroad.

One of the key functions, assigned to the network during its design and early years, was the development and maintenance of databases: referral databases and source databases.The former contain pointers to data or information, the users seek, the latter actually provide the data or information sought. A classical example of the referral-type database are bibliographic databases, containing elements descriptive of documents, but not the documents themselves. Examples of the source type are statistical tables, economic series, directories, and full-text documents.

III. Economic-technical infrastructure.

One of the most important pillars is the economic-technical infrastructure of an information transfer system, which relies so heavily on high technology.

The principal function of the Network is to provide public information services consisting of database searching and document delivery. These services are performed by the Network's sectoral, regional, and document delivery nodes. The coordinating central office is intended to serve users, who, for various reasons, may not be able to access or use the nodes, and to back up services of the nodes that are not fully operational.

Online access to foreign data bases began as a public service in May 1985; prior to that a delayed online search service operated via a university in the donor country. At present most but not all sectoral and regional nodes provide the data base search services. American, German, and French databases are accessed regularly the primary American vendors are DIALOG and BRS, and the National Library of Medicine. A systematic document delivery service, utilizing eight major libraries in the nation and several international libraries, was also introduced in 1985.

Funds have to be allocated to the most active nodes for upgrading their computers to more recent models, which operate more cost-effectively. Funds are short both for maintenance and upgrade.

A uniform cost-recovery practice generates local currency for services and documents provided. Several other donors also contributed equipment, funds for remote database access, and training.

As in most developing countries, here too data collection is a sensitive matter. Bibliographic databases are built by some sectoral nodes, while other nodes generate small source databases. Furthermore, the coordinating central office is responsible for producing several source databases as well, including the Union List of Foreign Periodicals in the country. This office is further responsible for continued technical assistance to sectoral nodes, seriously planning to generate the above mentioned databases and additional source databases.

The volume of services provided by the Network stabilized. One cause is the establishment of a competing information service in the nation. The appearance of new service organizations is both inevitable and healthy, and the probability is high that nation-wide the demand for information services will continue to grow rather than stagnate. the second reason is the rapidly growing application of portable CD-ROM database technology in the nation since 1987. There appears to be no reliable count of the number of CD-ROM devices in use in the country: medical schools, hospitals, agricultural faculties of universities are known to possess and use them. In the Network only one CD-ROM drive and data base (MEDLINE) are used experimentally. Document delivery service in the Network relies heavily on foreign document repositories, notably the British Library.

The Network's plan for 1987-1991 assumes the availability of high density optical storage devices and high-speed digital telecommunications. There is a new national packet-switching data networ in the country.

IV. Human resources development.

Most training has been directed at service operators and administrators, to assure quality services and the proper management of costly facilities.

The training program was conducted in two phases: a crash 10-course program provided by a contractor during 1984/85 generated qualified manpower to operate the services, and an on-going program of short courses since 1985 conducted by the network coordinating office, to update their skills and to train the staff the recently established nodes. Senior experts of the nodes participated in training new staff. Over ten years twenty one persons were trained overseas.

The Network is experiencing high attrition of trained staff, since high-technology information skills are much in demand in the Gulf states and in the private sector. Staff members, most of whom were trained abroad, leave the country for several years or permanently. Others accept positions with foreign companies or organizations.

A local variation on the theme of "brain drain" is prevalent. It consists of Network employees working part-time for other projects, which build information systems in the capital. Since the salaries of the technical consulting group have not been upgraded, experienced staff can supplement their income by earning 2-3 times their monthly salary with part-time work on these projects. This again results in services provided by inexpert junior staff, in the absence of staff, who were trained for those positions.

V. Management, including planning.

The Network is planned to become a nationwide cooperative of coordinated information services, intended to support the socio-economic development of the country The substructure of the Network, based on functional and geographical principles, is appropriate and should be further strengthened, particularly by extending the regional sub-network.

Each node has its individual plan, due to the different infrastructures and budgets of each node. There is no common plan for the whole Network, but it could be made, in the light of common understanding of Network consortium concepts.

From the point of view of the Network's organization and management, the near-term future presents several major challenges:

1. To accelerate its geographical expansion, which depends not only on technical aspects, but mainly on management-level communication and cooperation among the three subnetworks, and between the subnetwork and the coordinating central office headquarters.

2. To improve the performance of the Network's sectoral subnetwork. The political difficulties and personality problems of a non-performing service node do not justify to allow it to continue in that mode. The lesson learned from this experience is that the selection of member nodes in a public service network should be made strictly on the basis of their professional and service potential.

3.Cohesion of the Network, particularly its sectoral subnetwork, has to be cemented. Consortia and networks are perhaps the most difficult organizational forms to manage and administer. An important approach to strengthening bonds between network members and its coordinating organization is to maximize communication in general, and joint decision-making in particular.

Conclusions.

A broad review of the performance of the Network between 1983 and 1989 identifies a good number of unqualified successes, and a few weaknesses, when judged against its design objectives.

Accomplishments.

1. The consortium provides effective and efficient public access to international knowledge resources for a significant percentage of its potential user population.

2. Common pricing policies for information services are adopted throughout the Network.

3. A common interface query language is used across the board, which conforms to international standards of database searching.

4. A common electronic record format is used nation-wide, based on international standards for a domestic bibliographic database.

5. A standard, effective, geographically expanding system of document delivery from major domestic libraries and international document depbsitories exists.

Partial accomplishments and failures.

1. Some of the nodes do not provide adequate public information services.

2. Some of the sectoral nodes do not contribute to a national bibliographic database adequately. This national science and technology database is to be generated by all nodes in a distributed fashion.

3. Cooperation is inadequate between the network and other important data gathering departments, as well as some high-level information agencies, with respect to policies, planning, development and coordination.

4. The network coordination office is an artifact of the project, and not an official institution. It has assumed some functions of sectoral nodes, to the detriment of its original mission relative to these nodes.

5. The ambitious design of the project overlooked simple solutions to the lack of a strong scientific-technical document repository in the country.

DISCUSSION

The five pillars of scientific-technical information transfer are discussed in detail below.

I. Economic-technical infrastructure.

1. Macroeconomic (country) level.

The infrastructure in the economic arena includes the availability of hard currency to purchase information products from abroad, from journals to databases, to continue beyond the time of receiving them as the project's gifts. For that the economy must have the ability to import them. Hard currency is often scarce in a developing country, to the extent that book stores, institutions, or libraries cannot order books on demand readily. Import taxes, if they are not waived on books, drive the prices of locally available books up. The buying power of institutions and individuals is low, in both kinds of currency, therefore prices remain high. The devaluation of local currency of indebted countries over time, and the rise in the prices of books further compounds this problem.

Transportation and communication facilities are decisive factors in information services. Relatively inexpensive technologies, such as books and microcomputers (CD/ROMs) are better duplicated than transported or accessed remotely, if transportation and communication are not well developed or they are overloaded.

The technical infrastructure for using modern information technology includes maintenance and repair shops for equipment, and the availability of supplies in the country. This applies from microfilm readers (bulbs) to copiers and to computers. Air conditioning and dehumidifying equipment in suitably built structures is the prerequisite to utilizing microfilm, copiers, and computers.

2. Microeconomic (institutional) level.

The institution designated to implement scientific-techical information transfer must have a budget to acquire publications on an ongoing basis--a budget, even in local currency, which is sufficient to fill demand for current information.

A library-information center designated as the recipient institution, should have a basic collection and it should be organized. Even if the resources are inadequate, the basic collection forms the nucleus of the new inforation transfer effort. Specific requirements are as follows:

Collection development

The local collection should be established. It includes project documents, gray materials of the government, maps, standards, theses, patents, journals, and books. A permanent commitment of funds, even if small, for the most needed journal subscriptions has to be made amidst the plenty of project-funded library materials.

The literature in the collection, prior to the start of information transfer from abroad, should be surveyed to plan a comprehensive and organized collection. A systematic acquisition plan can be prepared to cover all types of documents, retrospective and current, from local and foreign sources.

Communication with institutions, such as research centers and universities,local and foreign, to begin cooperation in gift and exchange has to be established, to provide information in view of the limitations of hard currency resources.

Arrangements must be made to obtain documents from international organizations, such as FAO, UN, etc., to ensure a systematic flow of relevant materials.

Information processing and organization

The decision about practices to be adopted should be made carefully, in compliance with economics, facilities, and standards. This applies to indexing, cataloging, user services, classification, and on a higher level to collection development, needs assessment, etc.

Rules, methods, and procedures of basic processes and operations should be established by means of a procedure manual, which should be carefully analyzed and elaborated for proper adoption.

A procedure manual should be compiled for each activity.

It should be regularly revised and maintained, according to standard procedures.

Information services.

Special care must be given to providing services fairly to all categories of users, including decision makers, planners, teachers, and students/the academic community, and "practitioners", such as extension workers, farmers, community health workers, after a careful assessment of their actual needs, and in compliance with the national development plan.

"How to use" manuals should be issued, oriented to each category of users.

Steady communication with users is highly recommended, in order to provide them with regular services and to acquaint them with information utilization techniques. Regular user seminars should be organized to activate the interaction of users towards information.

Specialized services should be provided voluntarily on important topics and public issues.

II. Information policy, including political-economic organization.

Information policy on the national and institutional level is needed to designate the organization or institution responsible for managing information transfer, and to enable it to perform its function by means of allocating a budget to it. The designation may define relationships between several organizations, who may share or cooperate in the task. Cooperation and coordination assures that the resources are utilized efficiently.

Often organizations compete for donated equipment, for the prestige of becoming a modern information center, or for the visibility lent to them by the project; allocation of tasks and rewards promotes cooperation. A common source of controversy is also the physical location of the center, especially if there is a new building. Since buildings mean grandeur, especially in the Middle East, competition for the facility may actually hold up its construction.

Model statutes should be worked out, to enable the centre to function in compliance with its increased responsibilities at the sectoral and national levels.

An advisory committee should be set up, including representatives of users from all categories and information/library specialists. The director of the center may serve as the secretary.

The committee's main tasks would be to set out collection development and user services policies; to ensure that an annual budget is allocated by the government, to strengthen cooperation and coordination with other information facilities locally and abroad, to give advice and to express demands for the future development of the work, to discuss and to accept the reports and plans about the work of the centre, and to establish rules for sorting out discarded materials (up-to-date policy).

A regular government budget should be granted to cover recurrent expenditures, including collection development, operating supplies, user services, systems upgrading and equipment maintenance.

The staff would work and coordinate within a frame of clear cut definition of tasks manifesting the precise roles and interconnection area of every member within the entire system. Job descriptions should be prepared and incorporated into the statutes.

It is necessary to establish functional linkages with local information facilities, to work toward a sound national information system. A link can be established between a specialized library and the major local publisher active in the discipline, the faculty(department) of the university, and a microfilming service bureau, to capture the literature of the subject.

Cooperation among information centers could strengthen overall capabilities, to avoid unnecessary duplication of work, and to achieve more effective use of the resources. They should exchange current acquisition lists, lists of current foreign journals, duplicates of UN publications, publishers' lists, books on information sources, lists of potential cooperating institutions. They could also have an agreement about participation in an interlibrary loan system. Some activities of the cooperation program can be: exchange group visits, exchange lists, training sessions.

Participants can set up a standing committee of directors, identify areas of local and foreign cooperation, establish contacts with national information systems in sister countries, and pertaining international and regional systems, discuss the terms of national cooperation, decide on the tasks at every level of cooperation development, thus establishing the executive coordinating committee of the national system. Cooperation will assure uniform practices and the adoption of international standards.

Cooperation is more problematic in developing countries, where most information centers are in the public sector. Cooperatives cutting across administrative boundaries are difficult to establish, to fund, and to manage; prospective

members may belong to different ministries. In one country Universities, granting baccalaureates in nursing are administered by the Ministry of Higher Education, but intermediate nursing programs belong to the Ministry of Health -- nursing education media are purchased through the two ministries, without coordination.

III. Information technology.

Information technology includes all information carrying objects (from books to databases), which can be purchased, transported, manufactured, and used without or with equipment that is hardware(equipment technology). Publishing, media technology, that is software production technology, and equipment, such as copiers, telephones, are part of information technology.

For sustainable information transfer, there are two major requirements in a developing country: that the technology be appropriate, and that the country develop its own information technology, or develop it jointly with similar countries of the region (e.g.the Arab countries).

To establish North-South information transfer, information technology has to be brought to the country. In specific terms this means that books, journals, indexes, databases, and equipment have to be shipped, installed, and used, within the framework of a project. The point is that this is not sufficient for the long term. The ability of the country's library-information system to purchase this technology has to be maintained through the infrastructure discussed above, more appropriate variants of the technology have to be developed, and native information technology is desirable.

Appropriate information technology.

Appropriate information is in the form, format, medium, and language, and on a level of sophistication suitable to the targeted user population.

Appropriate primary sources.

If information comes in a certain form, language, or format, and this format is not suitable for the majority of users, information repackaging is in order. Repackaging includes translation, popularization of style, or rewriting. For example, illiterate village midwifes cannot learn about infection control even from the most simple written material. Picture books or audiovisuals have to be prepared for them by trainers, who utilize the original information. Agricultural field researchers(on-farm demonstrators)benefit from printed literature in their own language; therefore English language handbooks have to be translated for them selectively. Only

the elite professionals of a developing country (in medicine, the sciences, or in engineering) can genuinely benefit from the literature used by their peers in the countries, where the literature originates. This fact may not be apparent even to those in the recipient organization, who request library collections. Reviews, digests, or oral presentations in the vernacular will have to be prepared from the original to accomplish information transfer.

Appropriate secondary and tertiary sources.

Secondary and tertiary sources are important--this is where electronic information technology abounds, and where the glamour of electronic databases and computer catalogs attracts both the receiver and the donor. In a country, where abstract journals are read often in lieu of the original documents abstracted, and are read slowly, they are more appropriate in paper format. Where index languages, Boolean combinations of free search terms, and truncated strings compound the challenge of the search language in a foreign language, on-line searching is not as rewarding, and definitely not as economical, as it is in the countries, where on-line searching was invented.

Indigeneous information technology.

In most developing countries native information technology is confined to traditional forms : printed or near-print documents as software, and typewriters as hardware. Desktop publishing is on the rise, and in several countries databases are developed on computers, such as PADOC and the Sahel database. The Food and Agricultural Organization (FAO) and other international agencies have been instrumental in promoting the development of databases, with each member country providing input. Efforts and progress have been made to develop the indigeneous publishing and book industries. Paper supply is variable, and all Middle Eastern countries depend on imported paper.

In most countries, however, hardware and software technologies for information systems are not likely to be developed, as these products need the capital investment, management, and technical know-how of a "silicon valley"firm. The countries have to develop the industries, which will supply products to fill more basic needs (agricultural and food industry, consumer goods industries), or create products for exports.

A service industry is needed, nevertheless, for imported technologies, including the increasingly diversifying products of information technology.

Computer-information technology.

Equipment upgrading.

Organizations in the developing countries are facing the dilemma of maintaining computers or replacing them. The fact that managements recognize is that computer technology has a life cycle of about five years. It is more cost-effective to replace systems than to use them or to maintain them, as the cost performance of computers improves on the order of 15-25% per year.

This argument is valid in the developing countries, particularly when the existing machines no longer meet the computational requirements of the organizations. In some developing countries some computer centers have been inoperational 40-60% or more of the time during the year, compared with the maximum 5% down time considered acceptable by similar computer centres in the industrialized countries.

Therefore efforts of the developing countries have to be directed towards finding ways to best utilize existing systems. The following strategies are to be considered:

- Take the most cost-effective option to replace systems with state of the art equipment periodically;
- Decrease down-time to approach the acceptable 5% for service-oriented computer centers by means of good management
- Adopt systems, which hae been designed and proven to conform to international standards.

Computer catalogs.

An integrated library system is hardly needed, if the collection does not circulate, as is the case in most Middle Eastern libraries, and if acquisitions happens only once a year, as in most developing countries. A well designed catalog should allow cataloging chapters in books, and in-depth analysis of reference tools and reports, to make the most of small collections.

In most instances a microcomputer catalog can be tried before plans are made for a larger automated system. A microcomputer-based system is inexpensive, easy to install, to maintain, and to learn. Later it can be upgraded to a larger system. MINISIS and its microcomputer-based sisters, CDS/ISIS and MICRODIS, have the capability to exchange records between each other. A catalog built on a microcomputer can be transferred without programming from these two systems to a larger system, and the microcomputer can become a terminal.

Equipment.

Copiers are among the most useful pieces of information technology - copying is used often as a substitute for purchase. Copyright violation is widespread in the Middle East, due to the high price of imported printed materials.

User friendliness.

Training and ease of use determine the utilization of information technology. Enhanced keyboards, peripherals, such as mice, intuitive iconic representations of functions, and anything that makes it easier and more rewarding to use technology, is preferred. Manuals and other learning aids in the vernacular are important.

Equipment configuration.

Equipment, supplies and furnishings are often not used for their intended purpose, and not installed where they would be most useful.

Data entry terminals and user terminals should be multiples of what is the configuration of the same equipment than in the developed countries, since more people work shorter hours and slower in the developing countries(for example, the average number of books cataloged by experienced staff in a day is 4).

Social considerations.

In a developing country automation should not be used to save on labor costs, but to develop the human manpower. Often, where wages are low, and library workers are on the low end of the pay scale, the opportunity of learning computer skills is the best motivation to do a good job.

Supplies and maintenance.

Paper supply, ink cartridges, and other parts are crucial to stock in large quantities, to last beyond the expiration of the project, since funds may not be available to replenish them. Air conditioners and other temperature control devices are essential for the proper functioning of equipment. Installation and maintenance contracts must specify that the equipment must be serviced in the country by trained personnel. A maintenance and repair facility within the recipient agency is preferable for routine work.

Equipmert compatibility.

Often different donors provide equipment to the same agency. Attempts should be made to plan a configuration of compatible equipment, using in part available equipment. Equipment with the character set and software in the vernacular is often available, and should be preferred.

Backup tools.

Paper or microform equivalents of electronic catalogs or indexes, such as printouts, cards, and paper lists should be produced and maintained, parallel with electronic systems, both as archive records and as substitutes.

Resource sharing.

Cooperation between different information centers can

promote the utilization of equipment. A computer catalog of one library can become the union catalog of a cooperative. For the long term, members may share in the costs of maintaining the system.

The native character set and related hardware components are essential, so that the vernacular could be used for word processing and databases. The MINISIS information retrieval software is popular in the Middle East, because it can handle Arabic. AGROVOC, FAO's thesaurus, is presently Arabized as well.

Standards.

All but the smallest or experimental information systems have to adopt international standards for sustainability. Systems, which do not conform to standards, will require large scale modifications at a later stage,to achieve compatability, which would be too costly then. This applies to hardware, processing, vocabulary, etc.

Therefore development costs can be minimized over the long term by using ISO standards, and observing UNISIST guidelines.

This will also promote future linkage of the local system to those of other countries and to international networks.

IV. Human resource development.

A human resources program must build on strengths the local library-information system has. A comprehensive education and training program can develop more skilled personnel to plan, manage and operate the system and its services. Technical and managerial skills are needed for operating a scientific-techical information transfer system by local personnel.

Information manpower on the country level.

Library and information work is effected by several factors in developing countries. In many cases, staffs are not trained well in information management techniques, and some do not seem to be motivated to perform their tasks at a satisfactory level. This second factor is characteristic of the bureucratic system of public sector agencies, with low salaries and insufficient incentives. This is a problem of the infrastructure.

Education and training of information professionals, and of professional manpower in general is recognized as one of the most acute problems in developing countries.

In developing countries brain drain is a problem, that is the departure of qualified people to those countries, which offer better job opportunities. Developing countries need to replenish the lost manpower and train new employees in the needed skills. Capable persons, interested in a library and information career, should be given a chance.

Training facilities and training programs must exist in the country to train new people, and to upgrade the training of the staff. Academic degree programs, which are dominated by teaching theory, are not sufficient. There is need for training in the practical aspects of information work, that offer operational experience and provide the skills needed.

Local education and training of information professionals is hampered by several constraints:

- inadequacy of educational and training facilities;
- lack of qualified faculty and the low level of integration between the educational program and national needs;
- some of the trainees are drawn from other disciplines, and have no previous formal education in library and information work.

Objectives and strategies of training in developing countries have to be selected and designed, considering the status of libraries, the quality of information manpower, and its potential to attain certain levels of competency.

A combination of formal degree programs and specialized short term programs, conducted abroad and in the country, is needed to produce skilled information professionals, educators and trainers to build a national program for the long term. For these programs people with appropriate subect backgrounds have to be recruited.

For immediate needs a short range training program to produce a critical mass of qualified people to provide the manpower for the information transfer system.

Information manpower on the institution level.

Within the institution there must be a manager assigned to human resource development and to arranging training. To cope with the increase in the quantity and sophistication of information, staff has to be added and trained in information transfer. Training is needed in "low-or middle technology", that is existing practices, and modern methods. Increase in numbers and the diversification of functions requires reorganization. This means additional training, the identification of middle managers and supervisors, and their training. Top managers have to learn planning, organization, and delegation of responsibilities.

Career development.

The most decisive factor in running a successful organization is the staff's stability and career development opportunities to ensure this stability.

Career development for staff requires a review of jobs and reclassification. Budget allocation to personnel is needed from institutional funds for wages, and for continuing education.

User training.

The information center must have a proactive role in information transfer, and market its services aggressively. Conventional libraries in the Third World are more collection oriented than service oriented, therefore user outreach is an entirely new set of skills.

V. Management, including planning.

Good management determines the performance of institutions everywhere. In the Middle East the manager makes or breaks an organization, a system, or any effort.

Authority is concentrated on the top : good managers do not necessarily delegate, and poor managers frequently undermine talented subordinates.

A good manager with leadership, administrative skills, and professional/technical skills can compensate for weakness in some pillars of an information transfer system.

Some important qualities expected of good managers of a successful information transfer system are:

- resourcefulness in seeking funds, in approaching donors to supplement available resources;
- leadership in organizing a cooperative of information centers;
- authority to manage the total effort without interference from competing departments or organizations
- status within the parent organization to receive attention from top administrators, and to convince them to receive the needed budget;
- ability to identify talent and to delegate responsibility for specific operations;
- sufficient professional and technical knowledge to assess needs, to plan, to manage a sizeable and technically demanding operation, and to evaluate technical developments.

To implement and manage successful and sustainable

information transfer, as a project, and beyond the project, planning is needed before the project (pre-project planning), and for the institution that remains after the project (post-project planning).

Pre-project planning.

International development projects are planned jointly by the donors and the recipient country. In the plans scientific-technical information transfer is included as an area of implementation. Information professionals are rarely consulted in the planning phase, yet information policy and the infrastructure should be considered at that stage.

Needs assessment, an important part of planning, is often overlooked. This needs assessment should identify specific areas of the five critical components discussed here, as areas for establishing or strengthening, existing resources to build on, and opportunities for cooperation. Then the project will be able to include the needed activities to build a sustainable information transfer system.

Needs assessment should distinguish between the various segments of the user population, and their specific requirements, so that appropriate information and services be provided to them, with respect to technical sophistication, language, form, format. Needs assessment must take into consideration increasing expectations of users of an effective information system over the long term.

Training needs of staff and users have to be included in the needs assessment, to assure that the project's training plan pays attention to this component.

Coordination with other components of the project in the planning phase is needed, so that related project activities enhance each other. For example, in an agricultural development project, two separate project components prepared staffing plans that included library workers of agricultural experiment stations (the library-and-information systems component and the research station management component). Without coordination, the status and the supervisor of the librarians would have been different in two different plans. Realistic and simple objectives will be supported by other components of the project as well.

Proper planning can ensure that an operating budget is allocated for information transfer activities in the specific categories, which enable an expanded library-and-information system to function in the face of the influx of commodities. If this is overlooked, books and journals shipped from abroad will glut the system used to only a trickle of new books. Operating budgets are the backbone of sustainability. They

are the responsibility of the recipient institution, and they must be permanent.

Logical sequencing of activities is crucial, as new techniques must be introduced in concert with the influx of information. From simple to complex methods, from general to specific information analysis and dissemination, from orientation to training, from training to follow-on.

Post-project planning.

This is the strategic plan of the system, which during th life of the project can be started as a joint effort of foreign technical experts and host-country counterparts, ideally, the capable manager of the nucleus institution.

Key elements of this plan are options for activities, which, once established, strengthen the pillars, to the extent that it is possible. For example, generation of indigeneous literature in the form of journals, books, secondary publications or databases, can compensate for the lack of hard currency: these publications can form the "information capital" used for exchange, in lieu of purchase. Career development programs to retain trained staff members, and to develop future managers are part of strategic planning

Parts of the long term plan can serve as justification of proposals for policy changes, and for establishing cooperatives. Technology is the most unpredictable for the long term. For example, the up-and-coming microcomputer models of 1987, even before their arrival in 1989 became the ones which never quite made it in the West.

CONCLUSIONS and RECOMMENDATIONS

To design sustainable information transfer systems to developing contries, each of the five pillars have to be established ot strengthened. The donors and the recipients of project resources may consider this approach to project design and project implementation.

The economic-technical infrastructure and the policy pillars are completely within the domain of the recipient country. They exert decisive influence on the other pillars--we identified those elements, which impact the sustainability of the information transfer effort. In their realm, the project offers the opportunity to earmark information transfer as a priority, and to incorporate information transfer into the country's development program. For example, the country may subsidize publishing.

The donor agency also may identify the creation of indigeneous information technology as an objective of the project at hand, as well as the objective of other projects, such as private sector development and credit programs. Coordination of information transfer components of several projects by the donor agency could initiate coordination between various recipient agencies or sectors of the country as well. Coordination of existing resources and institutions within the country, their strengthening, and developing the country's information technology(information capital) are preferable to creating new institutions.

Management and human resource development are within the realm of technical assistance and of the information professionals in the host country. Competent project management will strengthen management and cooperation within and between information centers. Training in technical and management skills during the project, and continuous career development beyond will maximize the chances that the information transfer system will be sustainable.

Information professionals should participate from the beginning in planning the project. The information professionals of the country have to be identified, and all major organizations interested in information transfer can start cooperating at this stage. Competent information services, started as early as possible in the project, will generate satisfied users ready to advocate it, and to request more support from policy makers for the information center.

The information profession should take responsibility for maintaining the standard of professional manpower. The country's professional society can foster cooperation between professionals across organizations. The Society should participate in an information transfer project to maximize

its benefits over the long term.

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